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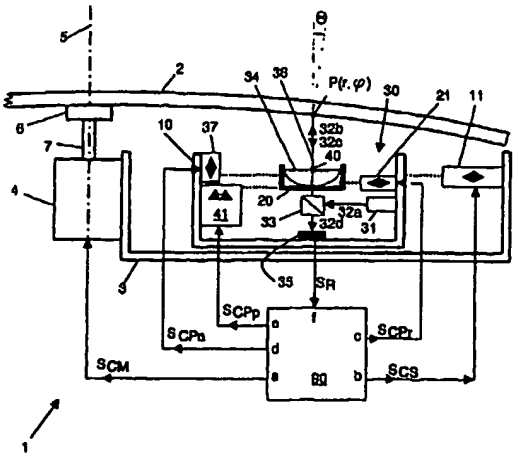
(54) Title: OPTICAL DISC DRIVE APPARATUS, METHOD FOR MEASURING TILT OF AN OPTICAL DISC, AND METHOD FOR CORRECTING TILT OF AN OPTICAL DISC



(57) Abstract: Tilt ($\theta(r, \phi)$) is measured in a measuring location ($P(r, \phi)$) of an optical disc (2). A pivotable objective lens (34) is brought to a first focus measuring location such as to focus a light beam (32) in a first anchor point ($P1(r-\Delta r1, \phi)$) having the same angular coordinate ϕ as said measuring location ($P(r,\phi)$) and having a small radial distance $\Delta r1$ from said measuring location. The objective lens is brought to a second focus measuring location such as to focus the light beam in a second anchor point ($P2(r+\Delta r2, \phi)$) having the same angular coordinate ϕ as said measuring location and having a small radial distance $\Delta r2$ from said measuring location, wherein said first and second anchor pints are located on opposite sides of said measuring location. Tilt in said measuring location is calculated from the coordinates of said two focus measuring locations of said objective lens.

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A. CLASSIFICATION OF SUBJECT MATTER
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B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2002/006089 A1 (AIKOH HIDEKI ET AL) 17 January 2002 (2002-01-17) paragraphs '0015!-'0019! paragraphs '0084!-'0099!	1,8,16, 17,20,21
A	US 6 151 174 A (HENDRIKS BERNARDUS H W) 21 November 2000 (2000-11-21) column 1, line 34 -column 2, line 7 column 2, line 42 -column 6, line 30	1,8,16, 17,20,21
A	EP 0 984 439 A (SAMSUNG ELECTRONICS CO LTD) 8 March 2000 (2000-03-08) paragraphs '0012!-'0029!	1,8,16, 17,20,21
A	EP 0 953 974 A (FUJITSU LTD) 3 November 1999 (1999-11-03) paragraphs '0009!-'0060! paragraphs '0063!-'0094!	1,8,16, 17,20,21

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
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Name and mailing address of the ISA	Authorized officer
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INTERNATIONAL SEARCH REPORT

International Application No
PCT/IB 03/02810

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 881 034 A (KANEKO KENJI ET AL) 9 March 1999 (1999-03-09) column 3, line 32-47	1,8,16, 17,20,21
A	US 5 322 993 A (OHYAMA MINORU) 21 June 1994 (1994-06-21) column 3, line 28-57 column 4, line 21 -column 7, line 47	1,8,16, 17,20,21
A	US 5 001 690 A (KAMIYA SHINGO ET AL) 19 March 1991 (1991-03-19) column 2, line 62 -column 3, line 12	1,8,16, 17,20,21
A	EP 0 357 323 A (SHARP KK) 7 March 1990 (1990-03-07) column 2, line 11 -column 3, line 58 column 11, line 47 -column 12, line 23	1,8,16, 17,20,21

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

International Application No
PCT/IB 03/02810

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2002006089 A1	17-01-2002	JP 2002083438 A	22-03-2002
US 6151174 A	21-11-2000	EP 0943142 A1	22-09-1999
		WO 9918568 A1	15-04-1999
		JP 2001507494 T	05-06-2001
EP 0984439 A	08-03-2000	KR 2000013163 A	06-03-2000
		CN 1244702 A	16-02-2000
		EP 0984439 A2	08-03-2000
		JP 2000057607 A	25-02-2000
		US 6282161 B1	28-08-2001
EP 0953974 A	03-11-1999	JP 3443668 B2	08-09-2003
		JP 2000021014 A	21-01-2000
		EP 0953974 A2	03-11-1999
		US 2002075774 A1	20-06-2002
		US 2003112722 A1	19-06-2003
US 5881034 A	09-03-1999	JP 10064071 A	06-03-1998
		JP 10097727 A	14-04-1998
US 5322993 A	21-06-1994	JP 3193105 B2	30-07-2001
		JP 6028694 A	04-02-1994
US 5001690 A	19-03-1991	JP 1199329 A	10-08-1989
		JP 2605776 B2	30-04-1997
EP 0357323 A	07-03-1990	JP 2018571 C	19-02-1996
		JP 2068734 A	08-03-1990
		JP 7058559 B	21-06-1995
		DE 68916342 D1	28-07-1994
		DE 68916342 T2	15-12-1994
		EP 0357323 A2	07-03-1990
		US 5065380 A	12-11-1991